

Application No.: 10/009,336

Docket No.: 2729-117

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (canceled)
2. (currently amended) A surface traveling mobile apparatus which moves by an endless track belt trained around a case thereby traveling on a surface by rotation of wheels driven by a power source, the surface traveling mobile apparatus comprising:  
vacuum chambers installed to be attached to sides of the wheels;  
a vacuum tube connecting the vacuum chambers to each other;  
a vacuum pump formed in a part of the vacuum tube for intaking and exhausting air; and  
suction mechanisms installed along the endless track belt at predetermined intervals, valve  
driven by contacting the wheels, and vacuum attached to the surface by the vacuum pump intaking  
and exhausting air  
The surface traveling mobile apparatus of claim 1, wherein the vacuum pump comprises :  
a motor for generating a rotary rotatory force;  
a rotating magnet, in which the N pole and the S pole are alternately arranged and which is  
rotated by the rotary rotatory force of the motor, the rotating magnet for generating being adapted to  
generate a varying different magnetic fields field;  
a fixed magnet arranged to be opposite to the rotating magnet;  
a pump having a diaphragm operating by [[the]] attraction and repulsion forces between the  
rotating magnet and the fixed magnet;  
a vacuum pump chamber, from which air the air inside of which is pumped outside due to

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[[the]] movement of the diaphragm; and

directional valves installed in openings at both ends of the vacuum pump chamber, ~~the one directional valves~~ for permitting the pumped air to flow in only one direction.

3. ~~(currently amended)~~ A surface traveling mobile apparatus which moves by an endless track belt trained around a case thereby traveling on a surface by rotation of wheels driven by a power source, the surface traveling mobile apparatus comprising:

vacuum chambers installed to be attached to sides of the wheels;

a vacuum tube connecting the vacuum chambers to each other;

a vacuum pump formed in a part of the vacuum tube for intaking and exhausting air; and

suction mechanisms installed along the endless track belt at predetermined intervals, valve driven by contacting the wheels, and vacuum attached to the surface by the vacuum pump intaking and exhausting air;

~~The surface traveling mobile apparatus of claim 1,~~ wherein each of the suction mechanisms comprises:

a hollow valve case formed to be integrated with the endless track belt;

a valve driver formed on a part of the valve case and coming in and going coming out from the valve case by contacting the wheels;

a lever operated by the valve driver coming in and going coming out from the valve case;

a ball moving up and down in the hollow portion of the valve case by [[the]] operation of the lever;

a spring for providing an elastic bias, said spring being installed to contact [[the]] an upper portion of the ball in the hollow portion of the valve case, the spring for providing an elastic bias; and

a flexible body formed to be integrated with [[the]] a lower portion of the valve case and vacuum attached to or detached from [[a]] the surface when air is evacuated from or supplied into a space between the surface and said flexible body by evacuating the air therein or supplying air

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thereinto through a lower O ring opening of the valve case due to movement the operation of the ball [[valve]].

4. (original) The surface traveling mobile apparatus of claim 3, wherein each of the suction mechanisms further comprises a separation preventing groove so that the valve driver in the valve case is not separated from the valve case.

5. (currently amended) A surface traveling mobile apparatus which moves by an endless track belt trained around a case thereby traveling on a surface by rotation of wheels driven by a power source, the surface traveling mobile apparatus comprising:

vacuum chambers installed to be attached to sides of the wheels;  
a vacuum tube connecting the vacuum chambers to each other;  
a vacuum pump formed in a part of the vacuum tube for intaking and exhausting air;  
suction mechanisms installed along the endless track belt at predetermined intervals, valve driven by contacting the wheels, and vacuum attached to the surface by the vacuum pump intaking and exhausting air; and

~~The surface traveling mobile apparatus of claim 1, further comprising an articulated apparatus having~~

~~a boom, which [[can be]] is telescopically extended and retracted extendable and retractable, and~~

~~a further suction mechanism [[for]] being vacuum attachable attached to and detachable detached from [[a]] the surface, wherein the further suction mechanism [[which]] is formed at the end of [[a]] the boom in the articulated apparatus, so that the surface traveling mobile apparatus safely travels on a rugged surface or over an obstacle.~~

6. (currently amended) The surface traveling mobile apparatus of claim [[1]] 2, further comprising a belt tension controlling apparatus for controlling the tension of the endless

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track belt ~~in part of the surface traveling mobile apparatus~~ so that the surface traveling mobile apparatus safely travels on a rugged surface or over an obstacle.

7. (currently amended) The surface traveling mobile apparatus of claim [[1]] 2, wherein each of the wheels comprises:

grooves for preventing the wheel from being separated from the endless track belt when the wheel contacts the endless track belt; and

an opening for letting air flow between the wheel and the suction mechanism to the vacuum chamber.

8. (canceled)

9. (currently amended) A cleaning apparatus for automatically cleaning a surface by being moved by a surface traveling mobile apparatus which moves by an endless track belt trained around a case thereby traveling on the surface by rotation of wheels driven by a power source, the cleaning apparatus comprising:

vacuum chambers installed to be attached and sealed to the wheels;

a vacuum tube connecting the vacuum chambers to each other;

a vacuum pump formed in a part of the vacuum tube for pumping air;

suction mechanisms installed along the endless track belt at predetermined intervals, valve driven by contacting the wheels, and vacuum attached to the surface by operation of the vacuum pump;

a spraying device for spraying water or a wash liquid on the surface when the surface traveling mobile apparatus moves; and

a rotating brush for washing the surface using the sprayed water or liquid;

The cleaning apparatus of claim 8, wherein the vacuum pump comprises:

a motor for generating a rotary rotatory force;

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a rotating magnet, in which the N pole and the S pole are alternately arranged and which is rotated by the rotary rotatory force of the motor, the rotating magnet ~~for generating~~ being adapted to generate a varying different magnetic fields field;

a fixed magnet arranged to be opposite to the rotating magnet;

a pump having a diaphragm operating by [[the]] attraction and repulsion forces between the rotating magnet and the fixed magnet;

a vacuum pump chamber, from which air ~~the air inside of~~ which is pumped outside due to [[the]] movement of the diaphragm; and

directional valves installed in openings at both ends of the vacuum pump chamber, ~~the one~~ directional valves for permitting the pumped air to flow in only one direction.

10. (currently amended) The cleaning apparatus of claim [[8]] 9, wherein each of the suction mechanisms comprises:

a hollow valve case formed to be integrated with the endless track belt;

a valve driver coming in and coming going out from at least a part of the valve case by contacting the wheels;

a lever operated by the valve driver coming in and coming going out from the valve case;

a ball moving up and down in the hollow portion of the valve case by [[the]] operation of the lever;

a spring for providing an elastic bias, said spring being installed to contact [[the]] an upper portion of the ball in the hollow portion, ~~the spring for providing an elastic bias~~; and

a flexible body formed to be integrated with [[the]] a lower portion of the valve case and vacuum attached to or detached from [[a]] the surface when air is evacuated from or supplied into a space between the surface and said flexible body by ~~evacuating the air therein or supplying air thereto~~ through a lower O ring opening of the valve case due to movement ~~the operation~~ of the ball [[valve]].

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11. (original) The cleaning apparatus of claim 10, wherein each of the suction mechanisms further comprises a separation preventing groove so that the valve driver in the valve case is not separated from the valve case.

12. (currently amended) The cleaning apparatus of claim [[8]] 9, further comprising an articulated apparatus having

a boom, which [[can be]] is telescopically extended and retracted extendable and retractable, and

a further suction mechanism [[for]] being vacuum attachable attached to and detachable detached from [[a]] the surface, wherein the further suction mechanism [[which]] is formed in the suction mechanism at the end of [[a]] the boom in the articulated apparatus, so that the surface traveling mobile apparatus safely travels on a rugged surface or over an obstacle.

13. (currently amended) The cleaning apparatus of claim [[8]] 9, further comprising a belt tension controlling apparatus for controlling the tension of the endless track belt in part of the surface traveling mobile apparatus so that the surface traveling mobile apparatus safely travels on a rugged surface or over an obstacle

14. (currently amended) The cleaning apparatus of claim [[8]] 9, wherein each of the wheels comprises:

grooves for preventing the wheel from being separated from the endless track belt when the wheel contacts the endless track belt; and

an opening for letting air flow between the wheel and the suction mechanism to the vacuum chamber.

15. (currently amended) The cleaning apparatus of claim [[8]] 9, further comprising a sensing apparatus for sensing a load limit display bar code printed on [[a]] the surface.

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16. (new) The surface traveling mobile apparatus of claim 2, wherein each of the suction mechanisms comprises:

a hollow valve case formed to be integrated with the endless track belt;

a valve driver formed on a part of the valve case and coming in and going out from the valve case by contacting the wheels;

a lever operated by the valve driver coming in and going out from the valve case;

a ball moving up and down in the hollow portion of the valve case by operation of the lever;

a spring for providing an elastic bias, said spring being installed to contact an upper portion of the ball in the hollow portion of the valve case; and

a flexible body formed to be integrated with a lower portion of the valve case and vacuum attached to or detached from the surface when air is evacuated from or supplied into a space between the surface and said flexible body through a lower O ring opening of the valve case due to movement of the ball.

17. (new) The surface traveling mobile apparatus of claim 2, further comprising an articulated apparatus having

a boom, which is telescopically extendable and retractable, and

a further suction mechanism being vacuum attachable to and detachable from the surface, wherein the further suction mechanism is formed at the end of the boom so that the surface traveling mobile apparatus safely travels on a rugged surface or over an obstacle.